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Tao Chen

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EXAMINER

NG, CHRISTINE Y

ART UNIT

PAPER NUMBER

2616

NOTIFICATION DATE

DELIVERY MODE

01/24/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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| | | | | |
|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 09/755,659 | | CHEN ET AL. | |
| | Examiner | | Art Unit | |
| | Christine Ng | | 2616 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21, 24 and 26-35 is/are rejected.
- 7) ☒ Claim(s) 22 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 5-7, 10-12, 16-20, 24 and 26-35 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,590,873 to Li et al.

Referring to claim 1, Li et al disclose a method for adjusting transmit power levels of a plurality of transmissions in a wireless communication system, the method comprising:

Receiving a first indication (Figure 4, supplemental PC bit) of a received quality of a first transmission (Figure 2, forward supplemental channel).

Adjusting (increase or decrease) the transmit power level of the first transmission based at least in part on the first indication. Refer to Column 3, lines 36-41.

Receiving a second indication (Figure 4, fundamental PC bit) of a received quality of a second transmission (Figure 2, forward fundamental channel), wherein the first and second indications are respectively formed from first and second portions of a plurality of power control bits (Figure 4, second bit and fourth bit or power control group 40) defined by the system for feedback for the plurality of transmissions (Column 3,

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lines 27-52), wherein the first and second portions are distributed proportionally differently according to different power control modes of the system. As shown in Figure 4, the supplement PC bit and fundamental PC bit may also occupy the fourth and second bit positions, the first and third bit positions, the third and first bit positions, the first and second bit positions, or the third and fourth bit positions, respectively, in the power control group 40. Separation of the pilot sub-channels and power sub-channels better combats fading. The placement of the supplement PC bit and fundamental PC bit affects the fading of the pilot channel, which affects the power control of the system. Power is increased to compensate for the fading. Therefore, the distribution of the power control sub-channels is done according to power control modes of the system. If the system is experiencing extreme fading and needs power control, the power control sub-channels will separate the pilot sub-channels. Refer to Column 1, lines 12-17 and lines 54-62; and Column 3, line 53 to Column 4, line 14.

Adjusting (increase or decrease) the transmit power level of the second transmission based at least in part on the second indication. Refer to Column 3, lines 43-48.

Referring to claim 2, Li et al disclose that the first indication comprises a power control command (supplemental power control bit) that indicates whether to increase or decrease the transmit power level of the first transmission. Refer to Column 3, lines 36-41.

Referring to claim 5, Li et al disclose that the power control command is generated based on a comparison of the received quality (E_b/N_t ratio) of the first transmission against a setpoint (E_b/N_t threshold). Refer to Column 4, lines 21-40.

Referring to claim 6, Li et al disclose that the transmit power levels for the first and second transmissions are adjusted based solely on the first and second indications, respectively. Refer to the rejection of claim 1.

Referring to claim 7, Li et al disclose wherein the second indication comprises an erasure indicator bit indicating whether a frame in the second transmission was received correctly or in error. Refer to Column 1, lines 40-62 and Column 4, lines 41-48.

Referring to claim 10, Li et al disclose in Figure 4 that the first indication is received via a first power control sub-channel (supplemental PC sub-channel) and the second indication is received via a second power control sub-channel (fundamental PC sub-channel). Refer to Column 3, lines 27-52.

Referring to claim 11, Li et al disclose in Figure 4 that the first and second power control sub-channels are formed by time division multiplexing a power control channel (power control group 40). Refer to Column 2, lines 18-21.

Referring to claim 12, Li et al disclose in Figure 3 that the combined bit rate of the first and second power control sub-channels is limited to a particular bit rate. A power control group 40 is limited to a 1.25ms time interval of a reverse pilot channel. The power control group 40 is made up of four bits representing two pilot control sub-channels and two power control sub-channels. In each sub-channel, a single bit is

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transmitted, and each bit comprises $384 \times N$ symbols, where N represents a chip rate. The combined bit rate of the first and second power control sub-channels is limited to the combined chip rate of the first and second power control sub-channels. Refer to Column 3, lines 11-26.

Referring to claim 16, Li et al discloses that the second power control sub-channel is operative to send a plurality of metrics (E_b/N_t ratio or CRC) for the second transmission. Refer to Column 4, lines 15-52.

Referring to claim 17, Li et al disclose that one of the plurality of metrics indicates a step size for adjustment of the transmit power level (increasing or decreasing the E_b/N_t threshold) for the second transmission. Refer to Column 4, lines 21-40 and lines 49-52.

Referring to claim 18, Li et al disclose that one of the plurality of metrics is indicator of an amount of margin in the received quality of the second transmission for no frame erasure. The mobile user can send to the base station erasure indicator bits so that the base station can adjust its transmission power accordingly. If the base station receives one or more successive error indicator bits, the base station increases the power of its forward link. The mobile user indicates to the base station the amount of margin (amount of transmit power level increase) for no frame erasure (to prevent frame errors). Refer to Column 1, lines 54-62 and Column 4, lines 41-48.

Referring to claim 19, Li et al disclose that the wireless communication system is a CDMA system that conforms to cdma2000 standard or W-CDMA standard (none), or both (none). Refer to Column 2, lines 56-65.

Referring to claim 20, Li et al disclose a method for adjusting transmit power levels of a plurality of transmissions in a wireless communication system, the method comprising:

Receiving and processing a first transmission (Figure 2, forward supplemental channel) to determine a received quality (Column 4, lines 15-52) of the first transmission.

Forming a first indication (Figure 4, supplemental PC bit) for the received quality of the first transmission.

Receiving and processing a second transmission (Figure 2, forward fundamental channel) to determine a received quality (Column 4, lines 15-52) of the second transmission.

Forming (Figure 4, fundamental PC bit) a second indication for the received quality of the second transmission.

Sending the first and second indications via first and second power control sub-channel (Figure 4, supplemental PC sub-channel and fundamental PC sub-channel), respectively.

Wherein the first and second indications are respectively formed from first and second portions of a plurality of power control bits (Figure 4, second bit and fourth bit or power control group 40) defined by the system for feedback for the plurality of transmissions (Column 3, lines 27-52), wherein the first and second portions are distributed proportionally differently according to different power control modes of the system. Refer to the rejection of claim 1.

Referring to claim 24, Li et al disclose a power control unit for use in a wireless communication system, comprising:

A signal quality measurement unit (in mobile-telephone 12; Column 4, lines 15-52) operative to receive and process a first transmission (Figure 2, forward supplemental channel) to provide a first indication (Figure 4, supplemental PC bit) for a first metric (power control) for the first transmission.

A data processor (in mobile-telephone 12; Column 4, lines 15-52) operative to receive and process a second transmission (Figure 2, forward fundamental channel) to provide a second indication (Figure 4, fundamental PC bit) for a second metric (power control) for the second transmission.

A power control processor (in mobile-telephone 12; Column 3, lines 27-52) coupled to the signal quality measurement unit and the data processor, the power control processor operative to direct transmission of the first and second indications on first and second power control sub-channels (Figure 4, supplemental PC sub-channel and fundamental PC sub-channel), respectively.

Wherein the first and second indications are respectively formed from first and second portions of a plurality of power control bits (Figure 4, second bit and fourth bit or power control group 40) defined by the system for feedback for the plurality of transmissions (Column 3, lines 27-52), wherein the first and second portions are distributed proportionally differently according to different power control modes of the system. Refer to the rejection of claim 1.

Referring to claim 26, Li et al disclose a power control unit within a base station in a wireless communication system, comprising:

A channel processor (in base station 10) operative to receive and process a received signal to recover a first indication (Figure 4, supplemental PC bit) of a received quality of a first transmission (Figure 2, forward supplemental channel) and a second indication (Figure 4, fundamental PC bit) of a received quality of a second transmission (Figure 2, forward fundamental channel), wherein the first and second indications are respectively formed from first and second portions of a plurality of power control bits (Figure 4, second bit and fourth bit or power control group 40) defined by the system for feedback for the plurality of transmissions (Column 3, lines 27-52), wherein the first and second portions are distributed proportionally differently according to different power control modes of the system. Refer to the rejection of claim 1.

A power control processor (in base station 10) coupled to the channel processor and operative to receive the first and second indications and provide one or more commands to adjust transmit power levels of the first and second transmissions. Refer to Column 3, lines 27-52.

Referring to claim 27, Li et al disclose that the setpoint is adjusted based on the received quality of the first transmission. The transmission power level is increased if the E_b/N_t ratio is less than a threshold a setpoint (threshold) and decreased if the E_b/N_t ratio is greater than the threshold. The threshold is adjusted based on the quality of the first transmission. If an error occurred, mobile unit increases the threshold value for the

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E_b/N_t ratio. Otherwise, mobile unit decreases the threshold for the E_b/N_t ratio. Refer to Column 4, lines 15-52.

Referring to claim 28, Li et al disclose that the setpoint is adjusted upward responsive to the received quality of the first transmission being greater than the setpoint. If an error occurred, mobile unit increases the threshold value for the E_b/N_t ratio. Refer to Column 4, lines 49-52.

Referring to claims 29 and 30, Li et al disclose that the setpoint is adjusted downward responsive to the received quality of the first transmission being less than the setpoint. If an error has not occurred, mobile unit decreases the threshold value for the E_b/N_t ratio. Refer to Column 4, lines 49-52.

Referring to claim 31, Li et al disclose that a period between adjustments in setpoint is adjustable. The period between adjustments of the setpoint (threshold) is adjustable since it is based on when the mobile unit checks the CRC of each data frame to determine whether an error occurs in the transmission of the data frame. Refer to Column 4, lines 41-52.

Referring to claims 32 and 33, refer to the rejection of claim 31. Successive upward (claim 32) and downward (claim 33) adjustments are adjustable depending on when the mobile unit checks the CRC of each data frame and determines when an error has occurred. Refer to Column 4, lines 41-52.

Referring to claim 34, Li et al that the amount of upward adjustment in setpoint is independent of the amount of downward adjustment in setpoint. The upward and downward adjustment of the setpoint (threshold) depends on the CRC of each data

frame and whether or not an error has occurred in the transmission of the data. Refer to Column 4, lines 41-52.

Referring to claim 35, refer to the rejection of claim 1. Furthermore, Li et al disclose in Figure 4 that the plurality of power control bits have a rate equal to that of the first indication. A power control group 40 is limited to a 1.25ms time interval of a reverse pilot channel. The power control group 40 is made up of four bits representing two pilot control sub-channels and two power control sub-channels. In each sub-channel, a single bit is transmitted, and each bit comprises $384 \times N$ symbols, where N represents a chip rate. Each PC bit rate on the first and second power control sub-channels is equal to each bit's chip rate. Refer to Column 3, lines 11-26.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,590,873 to Li et al in view of U.S. Patent No. 6,233,439 to Jalali.

Li et al do not disclose that the transmit power levels of the first and second transmission are adjusted together based on the power control command.

Jalali et al disclose in Figure 1 that the mobile user generates two streams of power control bits; one stream is generated by estimating the received signal energy based on all traffic channels bits and the other stream is generated by estimating the

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received signal energy from the punctured power control bits and a subset of the traffic channel bits. If the frame rate changes, the base station uses the power control bits from the second stream. If the frame rate has not changed, the base station uses the power control bits from the first stream. Thus, if the successive frame rate does or does not change, successive streams of transmission will utilize the same power control commands from respective power control streams. Refer to Column 3, line 40 to Column 4, line 34. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include that the transmit power levels of the first and second transmission are adjusted together based on the power control command; the motivation being if successive streams of transmissions remain identical, the same power control commands can be used for all transmissions, thereby saving energy.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,590,873 to Li et al in view of U.S. Patent No. 6,233,439 to Jalali, and in further view of U.S. Patent No. 6,259,927 to Butovitsch et al.

Li et al do not disclose that a difference between the transmit power levels of the first and second transmissions is adjusted based on the second indication.

Butovitsch et al disclose in Figure 5B that a first and second base station transmit a first and second transmission to the base station controller, respectively. The controller determines new downlink transmission power commands for each base station based on the difference between the two downlink transmit powers from the first and second base station. Refer to Column 11, lines 46-65. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include that

a difference between the transmit power levels of the first and second transmissions is adjusted based on the second indication; the motivation being so that the new transmission power levels can be within the range of the original first and second transmission power levels.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,590,873 to Li et al in view of U.S. Patent No. 6,148,208 to Love.

Li et al do not disclose that the second indication comprises a quality indicator bit indicating the quality of a received frame in the second transmission.

Love discloses that power control of a channel can be based on a quality indicator bit. A remote unit sends to the base station a quality indicator bit to indicate whether the quality of the frame was low or not. Refer to Column 4, lines 13-18 and lines 31-43. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include that the second indication comprises a quality indicator bit indicating the quality of a received frame in the second transmission; the motivation being that if the quality of the frame was low, the base station can increase the power level to improve the quality of future frames.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,590,873 to Li et al.

Li et al do not specifically disclose that the method further comprises: receiving a third indication of a received quality of a third transmission, wherein the third indication is formed from a third portion of the plurality of power control bits defined by the system

for feedback for the plurality of transmissions; and adjusting the transmit power level of the third transmission based at least in part on the third indication.

However, as shown in Figures 4 and 5, the power control group 40 format can be changed. If another channel is added to the system to transmit data to the mobile station, an additional third indication can be added to the power control group 40. Refer to Column 3, line 53 to Column 4, line 14. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include receiving a third indication of a received quality of a third transmission, wherein the third indication is formed from a third portion of the plurality of power control bits defined by the system for feedback for the plurality of transmissions; and adjusting the transmit power level of the third transmission based at least in part on the third indication; the motivation being to perform power control on an additional third transmission to the mobile station.

8. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,590,873 to Li et al in view of U.S. Patent No. 6,539,008 to Ahn et al.

Referring to claim 13, Li et al do not disclose wherein bits allocated for the second power control sub-channel are aggregated to form the feedback for the second transmission at a lower rate but having increased reliability.

Ahn et al disclose in Figure 6 a power control method in which power control bits are aggregated to form the feedback for a data transmission at a lower rate but having increased reliability. By performing power control at the receiver once for every power control bit, a power control speed of 4800Hz is realized (612). Similarly, by performing

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power control at the receiver once at the average of two power control bits, three power control bits or four power control bits, a power control speed of 2400Hz (614), 1600Hz (615) or 800Hz (616) can be obtained, respectively. Averaging the power control bits lowers the rate of power control. Refer to Column 5, lines 1-61. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wherein bits allocated for the second power control sub-channel are aggregated to form the feedback for the second transmission at a lower rate but having increased reliability. One would have been motivated to do so in order to transmit the power control bits at a lower rate so the bits will experience less error and have better transmission quality.

Referring to claim 15, Li et al do not disclose wherein the feedback rate of the second transmission is selectable from among a set of possible feedback rates.

Ahn et al disclose in Figure 6 that the feedback rate of a data transmission is selectable from among a set of possible feedback rates (4800Hz (612), 2400Hz (614), 1600Hz (615) or 800Hz (616)). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wherein the feedback rate of the second transmission is selectable from among a set of possible feedback rates. One would have been motivated to do so in order to make the system more flexible by accommodating different data rates.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,590,873 to Li et al in view of U.S. Patent No. 6,539,008 to Ahn et al, and in view of U.S. Patent No. 6,498,785 to Derryberry et al.

Li et al do not disclose that the feedback rate of the second transmission is based at least in part on a frame size of the second transmission.

Derryberry et al disclose that the time interval between measurements for power control (feedback rate) is based on the frame sizes available on the forward control channel for sending the power control messages. The forward control channel may have frame sizes of 5msec, 10msec or 20msec, giving time intervals of 5msec, 10msec or 20 msec, and power control update frequencies of 200Hz, 100Hz or 50Hz, respectively. Refer to Column 4, line 67 to Column 5, line 12; Column 10, lines 60-67; and Column 11, lines 6-24. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the feedback rate of the second transmission is based at least in part on a frame size of the second transmission; the motivation being that larger the frame size, the less often power control updates occur.

10. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,590,873 to Li et al in view of U.S. Patent No. 6,337,989 to Agin.

Li et al do not disclose that the method further comprises determining a duration of an interruption in the receiving and processing of the first transmission; and signaling for an increase in the transmit power level for the first transmission if the duration of the interruption is less than a particular time period.

Agin discloses in Figure 2 a power control algorithm for controlling a system subject to transmission interruption. The method comprises determining a duration of an interruption (transmission interruption period T_{int}) in the receiving and processing of

the first transmission; and signaling for an increase (δ_2) in the transmit power level for the first transmission if the duration of the interruption (T_{int}) is less than a particular time period (T'). In step 15, it is checked whether or not transmission is resumed after a transmission interruption period T_{int} , and if transmission is resumed, it is checked at step 16 if a given duration T' following the interruption period is still running. At step 18, if transmission is resumed and T' is still running, the method signals an increase in the power control step (δ_2). Refer to Column 6, lines 1-30. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the method further comprises determining a duration of an interruption in the receiving and processing of the first transmission; and signaling for an increase in the transmit power level for the first transmission if the duration of the interruption is less than a particular time period; the motivation being that during transmission interruptions, power control measurements are also interrupted so there must be an increase in the transmit power level in order to compensate for the effects of transmission interruption on power control. Refer to Column 1, line 58 to Column 2, line 25.

Allowable Subject Matter

11. Claims 22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Conclusion


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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. Ng 
January 11, 2008


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SUPERVISORY PATENT EXAMINER
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